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| 10/700,828 | 11/04/2003 | Thomas W. Stone | 10020907-1 | 6251 |
| 57299 | 7590 | 10/17/2006 | EXAMINER | |
| AVAGO TECHNOLOGIES, LTD. | | | BELLO, AGUSTIN | |
| P.O. BOX 1920 | | | ART UNIT | |
| DENVER, CO 80201-1920 | | | PAPER NUMBER | |
| | | | 2613 | |

DATE MAILED: 10/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/700,828

Applicant(s)

STONE, THOMAS W.

Examiner

Agustin Bello

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The Affidavit filed on 4/28/06 under 37 CFR 1.131 is sufficient to overcome the Doerr (U.S. Patent No. 6,754,410) reference.
2. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doerr (U.S. Patent No. 6,956,987) in view of Volodin (U.S. Patent No. 7,031,573).

Regarding claims 1, 5, 11-14, Doerr teaches a method for optically switching/routing comprising the steps of: separating input optical radiation into distinct input channels (reference numeral 805-1 in Figure 8); selecting desired distinct output channels (reference numeral 810-2 in Figure 8); propagating said distinct input channels through a selectable switching/routing sub-system (reference numeral 850 in Figure 8) in order to direct said distinct input channels to desired distinct output channels; recombining said desired distinct output channels (reference numeral 805-2 in Figure 8). Doerr differs from the claimed invention in that Doerr fails to specifically teach that the selectable switching/routing sub-system is grating based. However, Volodin, in the same field of optical switching, teaches that selectable grating based

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switching/routing sub-system are well known in the art (reference numeral 1020 in Figure 10).

One skilled in the art would have been motivated to employ a selectable grating based switching/routing sub-system as taught by Volodin since such switches have been found to provide optical transparency for a wide range of wavelengths, provide excellent longevity, outstanding thermal stability, good dynamic range, excellent optical quality, low cost, a variety of shapes, and refractive index isotropy (column 4 lines 59-67 of Volodin). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a selectable grating based switching/routing sub-system as taught by Volodin in the device of Doerr.

Regarding claims 2, 7, 8, Doerr teaches that the step of separating input optical radiation comprises the step of utilizing a separating sub-system comprising a pair of separating gratings (reference numeral 820-1 in Figure 8); and, wherein the step of recombining said desired distinct output channels comprises the step of utilizing a recombining sub-system comprising a pair of recombining gratings (reference numeral 820-2 in Figure 8).

Regarding claims 3, 15, Doerr teaches that the step of separating input optical radiation comprises the step of utilizing a separating sub-system comprising at least one Array Waveguide Grating (AWG) (reference numeral 820-1 in Figure 8); and, wherein the step of recombining said desired distinct output channels comprises the step of utilizing a recombining sub-system comprising at least one Array Waveguide Grating (reference numeral 820-2 in Figure 8).

Regarding claim 4, the combination of Doerr and Volodin teaches that the grating based switching/routing sub-system comprises a volume holographic grating based switching/routing sub-system (reference numeral 1020 in Figure 10).

Regarding claim 6, the combination of Doerr and Volodin teaches that the selectable switching/routing sub-system includes at least one pixellated switchable component (reference numeral 850 in Figure 8 of Doerr; reference numeral 1020 in Figure 10 of Volodin).

Regarding claim 9, the combination of references differs from the claimed invention in that it fails to specifically teach that the at least one of said first separating diffraction grating, said second separating diffraction grating, said first recombining diffraction grating, and said second recombining diffraction grating comprises a volume holographic grating. However, as noted above, Volodin teaches that the use of volume holographic gratings as combining and separating gratings is well known in the art. One skilled in the art would have been motivated to employ volume holographic gratings as the combining and separating gratings of the system for the advantages presented above. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ volume holographic gratings as combining and separating gratings in the system of the combination of references.

Regarding claim 10, Doerr teaches that said first separating diffraction grating is substantially parallel to said second separating diffraction grating, and, said first recombining diffraction grating is substantially parallel to said second recombining diffraction grating (inherent in the AWGs of Doerr).

Regarding claim 16, Doerr teaches at least one microlens array (reference numeral 830-1, 830-2 in Figure 8; reference numeral 305 in Figure 3).

Regarding claim 17, the combination of Doerr and Volodin teaches anamorphic optics for circularizing the waveguide outputs of the separating AWG (reference numeral 830-2 in Figure 8 of Doerr; reference numeral 1011-1014 in Figure 10 of Volodin).

Regarding claim 18, both Doerr and Volodin teach means operably connected to said selectable switching and routing sub-system for controlling the state of each pixels from a plurality of pixels; said controlling means being capable of enabling the selecting of desired distinct output channels (column 2 lines 32-34 of Doerr; column 3 line 12 of Volodin).

Regarding claim 19, Doerr teaches a first means (reference numeral 850 in Figure 8) for receiving and directing each of a plurality of input beams of electromagnetic radiation to travel in free space along a predetermined path of a plurality of separate paths to a predetermined output location of a plurality of output locations; and second diffractive grating means (reference numeral 820 in Figure 8); said first means (reference numeral 850 in Figure 8) comprising a plurality of substantially evenly spaced apart switchable transmissive elements and each of said spaced apart switchable transmissive having at least one separately switchable region; and said at least one said separately switchable region of said switchable diffractive gratings capable of being selectively activated or deactivated in order to independently control which said predetermined path of said plurality of separate paths at least one of said plurality of input beams of electromagnetic radiation travels in free space (column 2 lines 25-45); said second diffractive grating means (reference numeral 820-2 in Figure 8) receiving a plurality of output beams from said plurality of output locations and redirecting said output beams, said plurality of redirected output beams being substantially parallel and substantially coplanar to said plurality of input beams, said first means (reference numeral 850 in Figure 8) and said second diffractive grating means (reference numeral 820-2 in Figure 8) constituting a planar switch (Figure 8). Doerr differs from the claimed invention in that Doerr fails to specifically teach that the first means is a diffractive grating means. However, Volodin, in the same field of optical switching, teaches that

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diffraction gratings are well known in the art (reference numeral 1020 in Figure 10). One skilled in the art would have been motivated to employ a diffraction grating as taught by Volodin since such switches have been found to provide optical transparency for a wide range of wavelengths, provide excellent longevity, outstanding thermal stability, good dynamic range, excellent optical quality, low cost, a variety of shapes, and refractive index isotropy (column 4 lines 59-67 of Volodin). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a diffraction grating as taught by Volodin in the device of Doerr.

Regarding claim 20, Doerr teaches that said second diffraction grating means comprises a fixed grating (reference numeral 820-2 in Figure 8).

Regarding claim 21, Doerr teaches a reflector array (reference numeral 850 in Figure 8); a location of said second diffraction grating means (reference numeral 820-2 in Figure 8) being substantially coincident with extensions of substantially evenly spaced apart switchable transmissive diffraction gratings; and wherein said reflector array further redirects said plurality of output beams ensuring that said plurality of output beams remain separated.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Agustin Bello
Primary Examiner
Art Unit 2613

AB